

File: 419

October 29, 2018

Ms. Amanda Lessard
Town of Windham
8 School Rd
Windham, ME 04062

RE: LUMBER WAREHOUSE, 989 ROOSEVELT TRAIL

Dear Amanda,

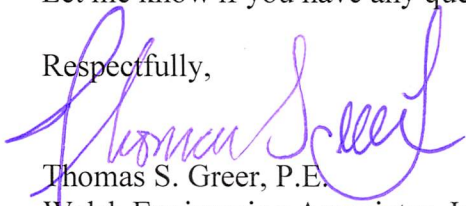
We have made a couple of minor modifications to the plans as a result of review comments from Portland Pipe Line. These include:

- Placing a "No Parking" sign just prior to the pipeline. It includes truck exit only provisions.
- We have eliminated one tree that would put the pipeline in jeopardy.

We have also included the revised stormwater calculations and report to address on Earl's comments.

Let me know if you have any questions.

Respectfully,



Thomas S. Greer, P.E.
Walsh Engineering Associates, Inc.

cc: John Hilmer, Joe Delaney, File

enc.



Portland Water District

FROM SEBAGO LAKE TO CASCO BAY

October 22, 2018

Tom Greer, P.E.
Walsh Engineering Associates
1 Karen Drive, Suite 2a
Westbrook, ME 04092

Re: 989 Roosevelt Trail, WI
Ability to Serve with PWD Water

Dear Mr. Greer:

The Portland Water District has received your request for an Ability to Serve Determination for the noted site submitted on October 12, 2018. Based on the information provided, we can confirm that the District will be able to serve the proposed project as further described in this letter. **Please note that this letter constitutes approval of the water system as currently designed. Any changes affecting the approved water system will require further review and approval by PWD.**

Conditions of Service

The following conditions of service apply:

- Our records show that the property is currently served with a 1-inch domestic water service. The existing service line at this site may be used to provide domestic water to the building. An approved backflow prevention device must be installed on the service line directly after the meter prior to service activation. Please refer to the PWD website for more information on cross-connection control policies.

Existing Site Service

According to District records, the project site does currently have existing water service. A 1-inch diameter copper domestic service line provides water service to the site. Please refer to the "Conditions of Service" section of this letter for requirements related to the use of this service.

Water System Characteristics

According to District records, there is an 12-inch diameter cast iron water main in Roosevelt Trail and a public fire hydrant located approximately 700 feet from the site. Recent flow data is not available in this area. The most recent static pressure reading was 72 psi.



Public Fire Protection

The installation of new public hydrants to be accepted into the District water system will most likely not be required. It is your responsibility to contact the Town of Windham Fire Department to ensure that this project is adequately served by existing and/or proposed hydrants.

Domestic Water Needs

The data noted above indicates there should be adequate pressure and volume of water to serve the domestic water needs of your proposed project.

Private Fire Protection Water Needs

You have indicated that this project will not require water service to provide private fire protection to the site. Please note that the District does not guarantee any quantity of water or pressure through a fire protection service. Please share these results with your sprinkler system designer so that they can design the fire protection system to best fit the noted conditions. If the data is out of date or insufficient for their needs, please contact MEANS to request a hydrant flow test and we will work with you to get more complete data.

Should you disagree with this determination, you may request a review by the District's Internal Review Team. Your request for review must be in writing and state the reason for your disagreement with the determination. The request must be sent to MEANS@PWD.org or mailed to 225 Douglass Street, Portland Maine, 04104 c/o MEANS. The Internal Review Team will undertake review as requested within 2 weeks of receipt of a request for review.

If the District can be of further assistance in this matter, please let us know.

Sincerely,
Portland Water District

A handwritten signature in black ink, appearing to read 'Robert A. Bartels', written in a cursive style.

Robert A. Bartels, P.E.
Senior Project Engineer



STORMWATER MANAGEMENT REPORT

for

Lumber Warehouse

989 Roosevelt Trail

Windham, Maine

October 1, 2018

(Revised October 26, 2018)

Project Description

This project is the renovation of the existing structure on site and the addition of a 1,760 sq. ft. new structure. The structure will be used for a cabinet shop and lumber storage. The existing structure will be a small retail space and residential apartment.

The site will have an entrance/exit for vehicles off Roosevelt Trail (Route 302) to a small parking area. Large trucks will use the exit only driveway to get back onto Route 302.

Existing Conditions

The site has an existing structure and driveway area that was formerly used as a retail space. The Portland Pipe Line has 3 gas mains that ran across the site with gravel access road. The site is sloped in the rear with some forest vegetation.

Developed Conditions

The site will have additional 12,891 sq. ft. of building and pavement added to it, with minor changes in the back of the site. The site generally drains to a low area in the front with some area draining to the rear of the site.

Soils

The site is on a sand and gravel deposit. The depth to groundwater is greater than 48" The County Soils Map for the area, shows this site as Hinkley, gravely sand, which are well drained.

Drainage

The site is graded to have the paved area general drain to the area adjacent Route 302. A stone sandwich is used to drain the area above the site under the exit driveway. The stormwater will infiltrate in these areas.

Methodology

The stormwater runoff analysis has been undertaken utilizing the HydroCAD Stormwater Modeling System software (Version 10) developed by the Applied Microcomputer Systems of Chocorua, New Hampshire. The program is based upon the TR-20 computer program and the TR-55 tabular method, both of which are based upon techniques developed by the USDA Soil Conservation Service. The analysis was undertaken for the 2-, 10-, and 25-year frequencies (3.1, 4.6, and 5.8 inches, respectively). Twenty-four hour storms with a Type III distribution were the basis for the analysis.

Treatment Results

This project adds 1,760 sq. ft. of building and 11,131 sq. ft. of pavement. All but 1,259 sq. ft. of new impervious is treated. With the treatment of 10,615 sq. ft. of existing, the total treated area is 22,247 sq. ft. The percentage treated is 210%. The developed portion of the site, 26,816 sq. ft. of which 27,138 sq. ft. of the new and existing and developed area gets treated, for a percentage of 101%. These exceed DEP Chapter 500 Standards.

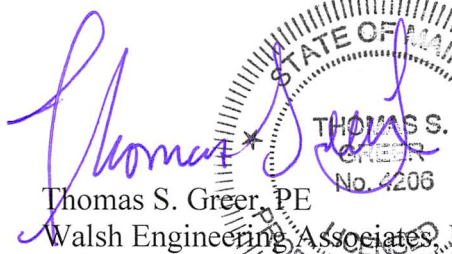
Peak Flows


The site drains to the north along the pipe line access road, down to elevation 323. The site's paved area drains to the center and joins with the water from Route 302. The water is infiltrated in that area. The model shows peak flows being reduced, see Table 1.

Table 1		
Peak Flows, cfs		
	Existing	Developed
2 yr	0.09	0.00
10 yr	0.82	0.03
25 yr	1.80	0.11

Conclusions

This project will infiltrate the stormwater through the 25 year storm. It reduces peak flows going north. No unreasonable impacts to downstream properties or environments will occur.


Thomas S. Greer, PE
Walsh Engineering Associates, Inc.

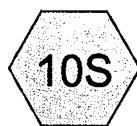




EXISTING SITE



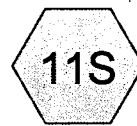
POA NORTH EXISTING



DEVELOPED SITE



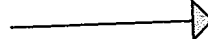
INFLITRATION AREA



DEVELOPED SITE
NORTH SIDE



POA NORTH



Routing Diagram for LUMBER WAREHOUSE, TSG 10.3.18
Prepared by Hewlett-Packard Company, Printed 10/26/2018
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LUMBER WAREHOUSE, TSG 10.3.18

Prepared by Hewlett-Packard Company

HydroCAD® 10.00-16 s/n 01454 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 2 YEAR Rainfall=3.10"

Printed 10/26/2018

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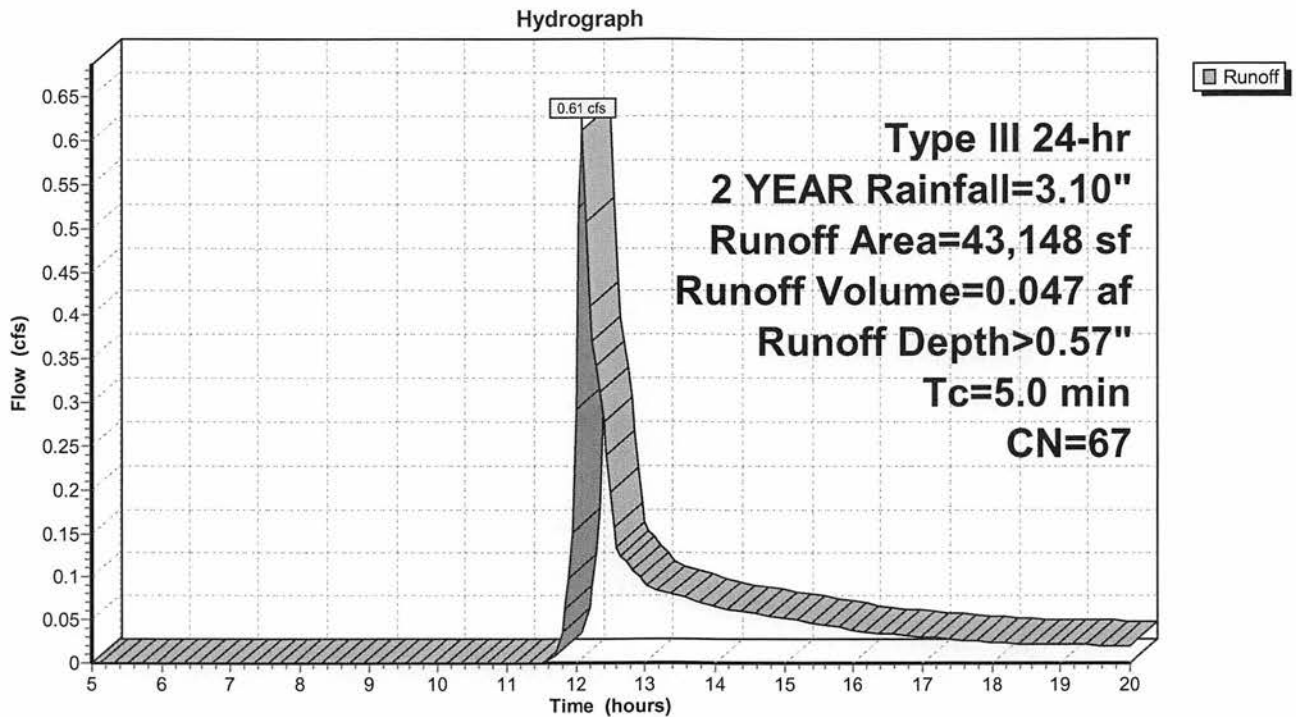
Summary for Subcatchment 10S: DEVELOPED SITE

Runoff = 0.61 cfs @ 12.10 hrs, Volume= 0.047 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	21,746	98	IMPERVIOUS
*	13,720	40	LANDSCAPED
*	7,682	30	WOODS A
	43,148	67	Weighted Average
	21,402		49.60% Pervious Area
	21,746		50.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 10S: DEVELOPED SITE

LUMBER WAREHOUSE, TSG 10.3.18

Prepared by Hewlett-Packard Company

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Type III 24-hr 2 YEAR Rainfall=3.10"

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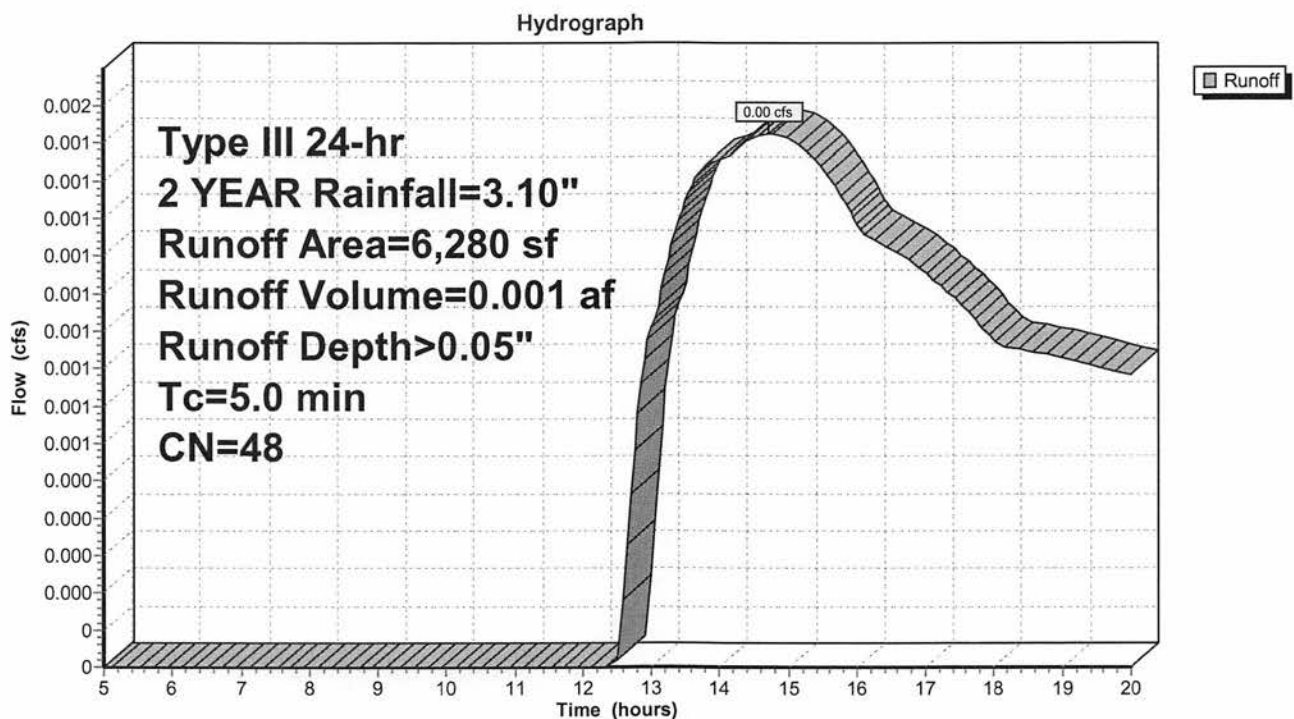
Summary for Subcatchment 11S: DEVELOPED SITE NORTH SIDE

Runoff = 0.00 cfs @ 14.73 hrs, Volume= 0.001 af, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	870	30	WOODS A
*	4,260	40	BRUSH
*	1,150	92	GRAVEL
	6,280	48	Weighted Average
	6,280		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 11S: DEVELOPED SITE NORTH SIDE

LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 2 YEAR Rainfall=3.10"

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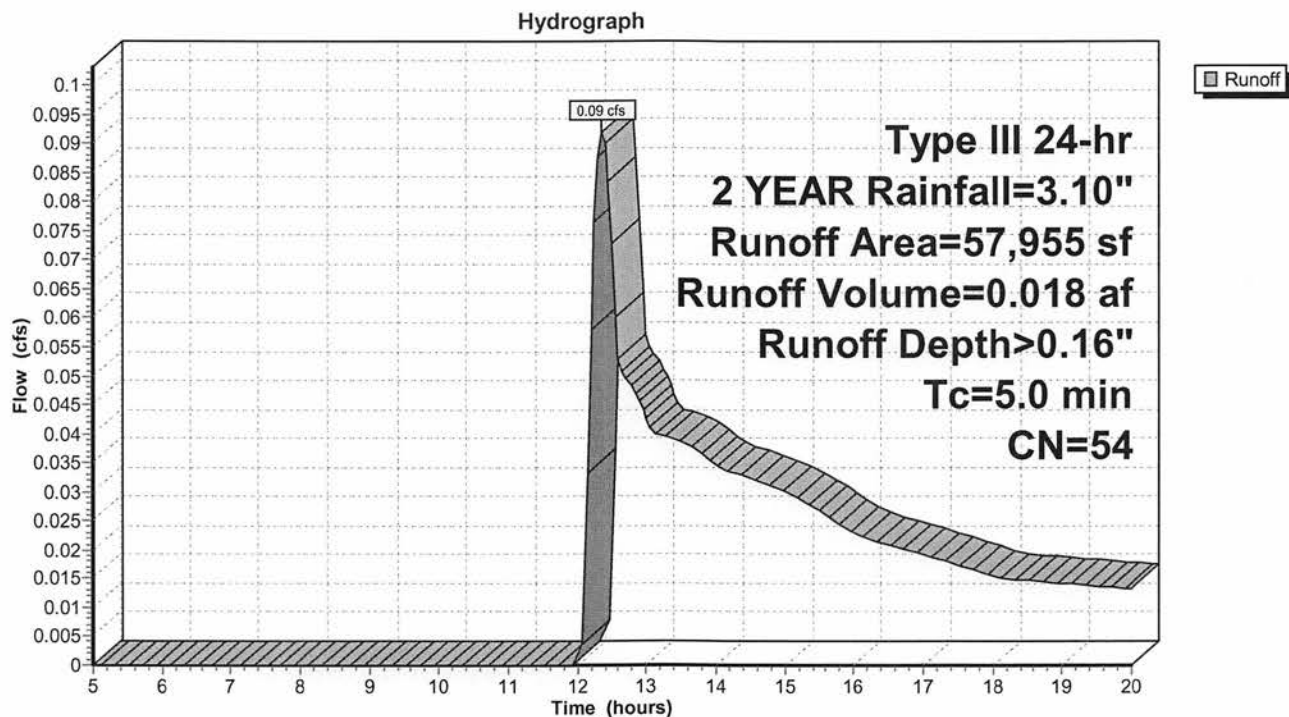
Summary for Subcatchment 14S: EXISTING SITE

Runoff = 0.09 cfs @ 12.36 hrs, Volume= 0.018 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	11,107	98	IMPERVIOUS
*	24,715	40	LANDSCAPED
*	15,681	30	WOODS A
*	6,452	92	GRAVEL
	57,955	54	Weighted Average
	46,848		80.84% Pervious Area
	11,107		19.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 14S: EXISTING SITE

Summary for Reach 1R: POA NORTH EXISTING

Inflow Area = 1.330 ac, 19.16% Impervious, Inflow Depth > 0.16" for 2 YEAR event
 Inflow = 0.09 cfs @ 12.36 hrs, Volume= 0.018 af
 Outflow = 0.09 cfs @ 12.37 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.71 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 0.45 fps, Avg. Travel Time= 0.4 min

Peak Storage= 1 cf @ 12.37 hrs

Average Depth at Peak Storage= 0.06'

Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.40 cfs

2.00' x 1.00' deep channel, n= 0.040

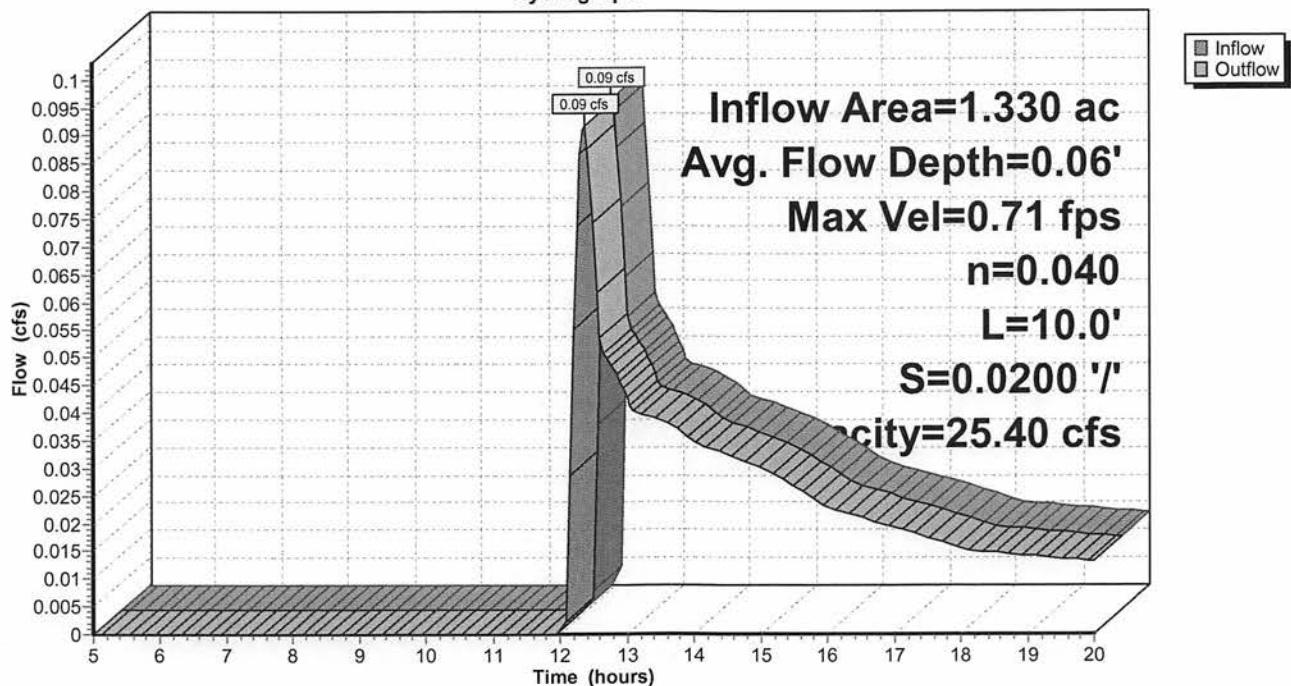
Side Slope Z-value= 5.0 ' ' Top Width= 12.00'

Length= 10.0' Slope= 0.0200 ' '

Inlet Invert= 0.00', Outlet Invert= -0.20'

**Reach 1R: POA NORTH EXISTING**

Hydrograph



LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 2 YEAR Rainfall=3.10"

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Summary for Reach 10R: POA NORTH

Inflow Area = 1.135 ac, 44.00% Impervious, Inflow Depth > 0.01" for 2 YEAR event
Inflow = 0.00 cfs @ 14.73 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 14.75 hrs, Volume= 0.001 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.24 fps, Min. Travel Time= 0.7 min

Avg. Velocity= 0.24 fps, Avg. Travel Time= 0.7 min

Peak Storage= 0 cf @ 14.74 hrs

Average Depth at Peak Storage= 0.00'

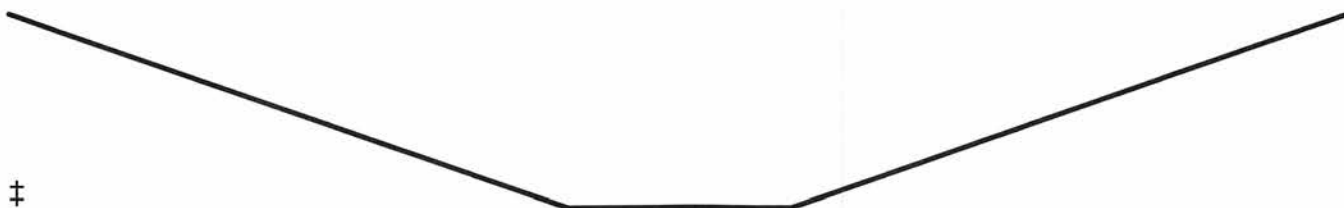
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.40 cfs

2.00' x 1.00' deep channel, n= 0.040

Side Slope Z-value= 5.0 ' / ' Top Width= 12.00'

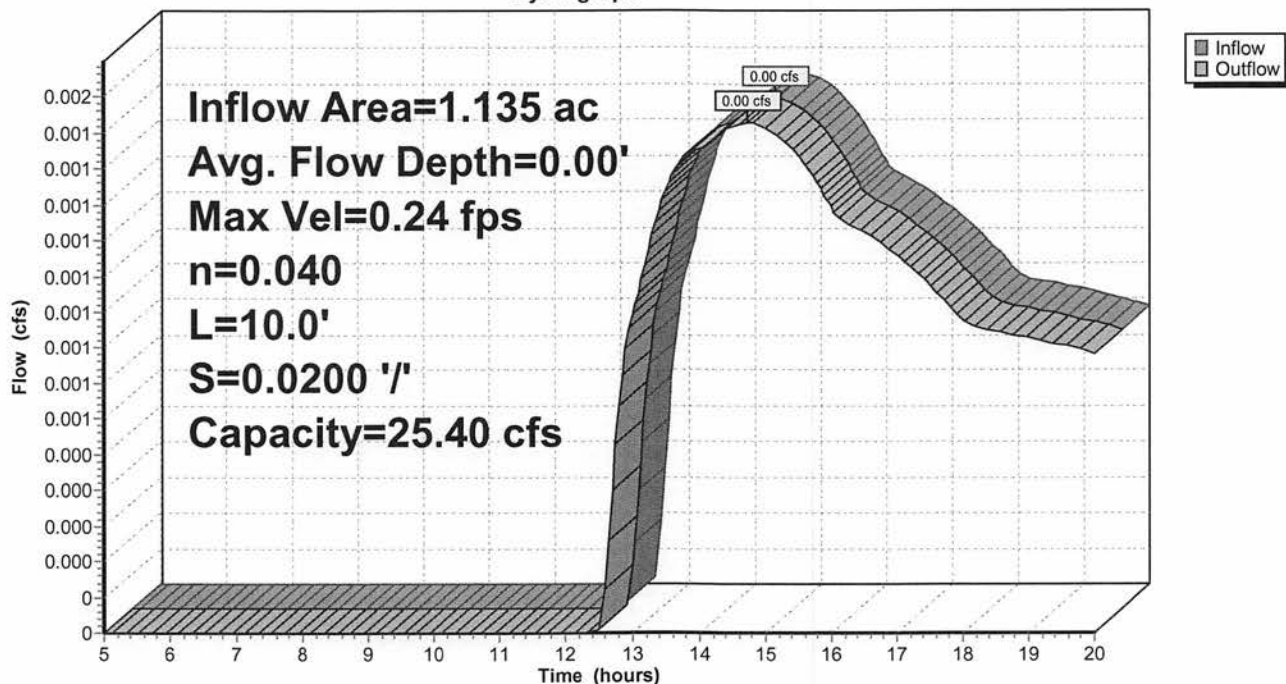
Length= 10.0' Slope= 0.0200 ' / '

Inlet Invert= 0.00', Outlet Invert= -0.20'



Reach 10R: POA NORTH

Hydrograph



LUMBER WAREHOUSE, TSG 10.3.18

Type III 24-hr 2 YEAR Rainfall=3.10"

Prepared by Hewlett-Packard Company

Printed 10/26/2018

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Summary for Pond 1P: INFILTRATION AREA

Inflow Area = 0.991 ac, 50.40% Impervious, Inflow Depth > 0.57" for 2 YEAR event
 Inflow = 0.61 cfs @ 12.10 hrs, Volume= 0.047 af
 Outflow = 0.17 cfs @ 12.53 hrs, Volume= 0.047 af, Atten= 72%, Lag= 26.1 min
 Discarded = 0.17 cfs @ 12.53 hrs, Volume= 0.047 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 24.76' @ 12.53 hrs Surf.Area= 856 sf Storage= 477 cf

Plug-Flow detention time= 23.3 min calculated for 0.047 af (100% of inflow)
 Center-of-Mass det. time= 22.6 min (860.6 - 838.0)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	11,200 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
24.00	400	0	0
25.00	1,000	700	700
26.00	5,000	3,000	3,700
27.00	10,000	7,500	11,200

Device	Routing	Invert	Outlet Devices
#1	Discarded	24.00'	8.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.00'
#2	Primary	26.00'	10.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.17 cfs @ 12.53 hrs HW=24.76' (Free Discharge)

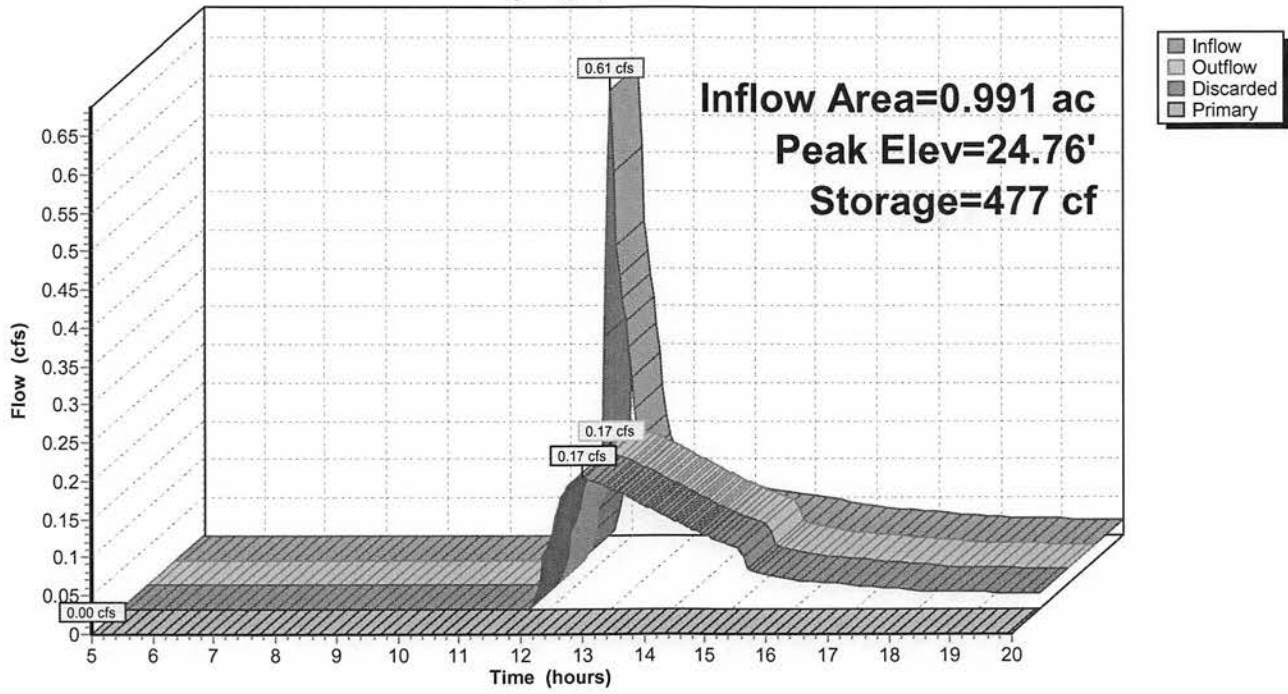
↑ **1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=24.00' (Free Discharge)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: INFILTRATION AREA

Hydrograph



LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 10 YEAR Rainfall=4.60"

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Summary for Subcatchment 10S: DEVELOPED SITE

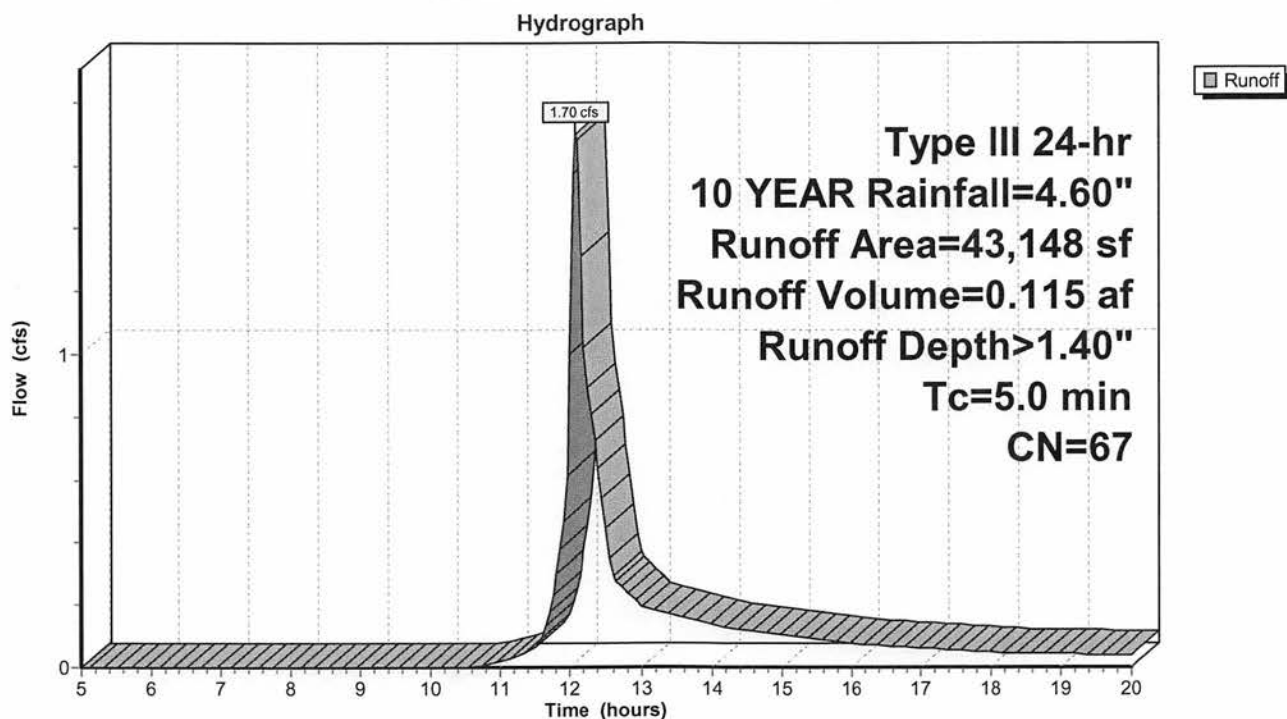
Runoff = 1.70 cfs @ 12.09 hrs, Volume= 0.115 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (sf)	CN	Description
*	21,746	98	IMPERVIOUS
*	13,720	40	LANDSCAPED
*	7,682	30	WOODS A
	43,148	67	Weighted Average
	21,402		49.60% Pervious Area
	21,746		50.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 10S: DEVELOPED SITE

LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 10 YEAR Rainfall=4.60"

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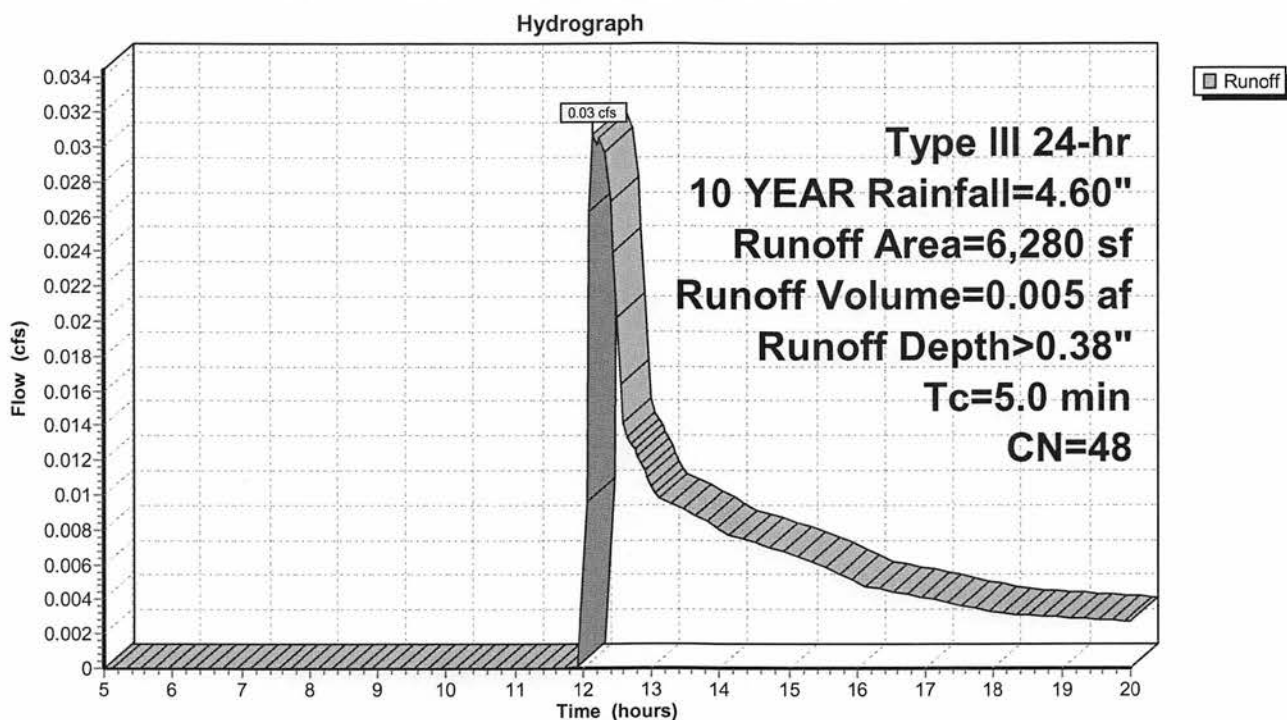
Summary for Subcatchment 11S: DEVELOPED SITE NORTH SIDE

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.005 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (sf)	CN	Description
*	870	30	WOODS A
*	4,260	40	BRUSH
*	1,150	92	GRAVEL
	6,280	48	Weighted Average
	6,280		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 11S: DEVELOPED SITE NORTH SIDE

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Type III 24-hr 10 YEAR Rainfall=4.60"

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Summary for Subcatchment 14S: EXISTING SITE

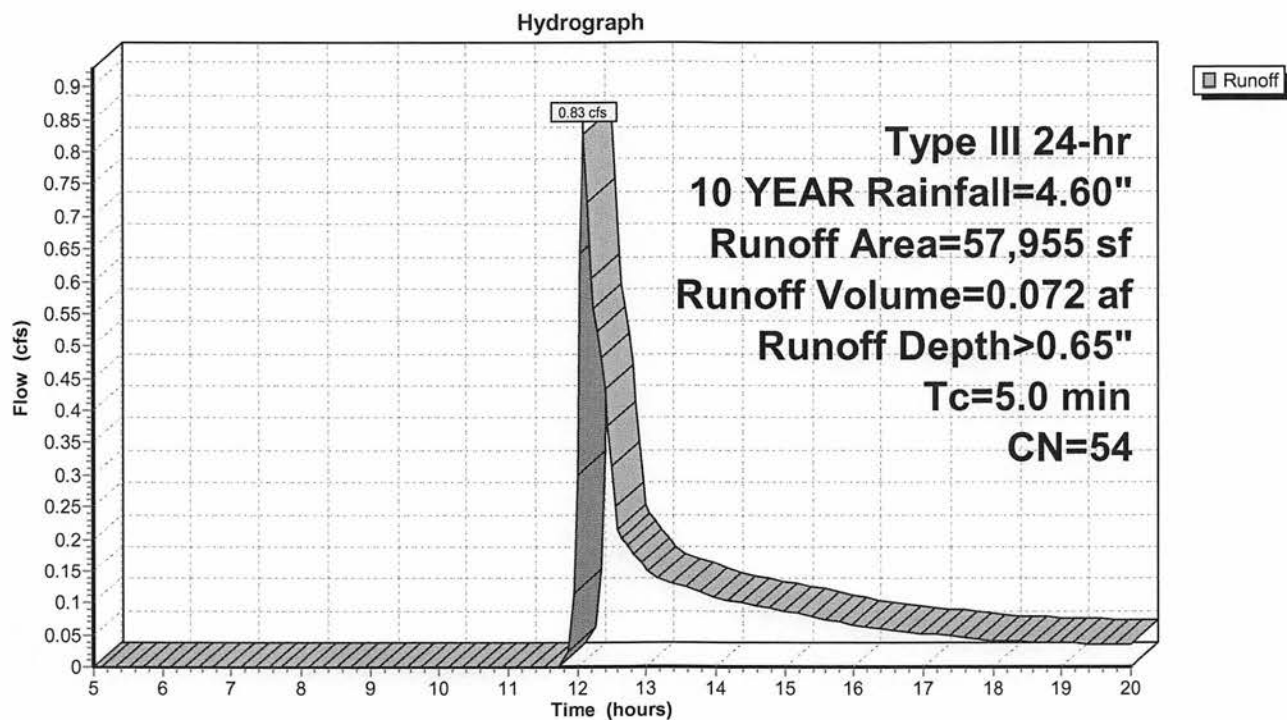
Runoff = 0.83 cfs @ 12.11 hrs, Volume= 0.072 af, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (sf)	CN	Description
*	11,107	98	IMPERVIOUS
*	24,715	40	LANDSCAPED
*	15,681	30	WOODS A
*	6,452	92	GRAVEL
	57,955	54	Weighted Average
	46,848		80.84% Pervious Area
	11,107		19.16% Impervious Area

Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
5.0					Direct Entry, DIRECT

Subcatchment 14S: EXISTING SITE

LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 10 YEAR Rainfall=4.60"

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Summary for Reach 1R: POA NORTH EXISTING

Inflow Area = 1.330 ac, 19.16% Impervious, Inflow Depth > 0.65" for 10 YEAR event
Inflow = 0.83 cfs @ 12.11 hrs, Volume= 0.072 af
Outflow = 0.82 cfs @ 12.11 hrs, Volume= 0.072 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.44 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 0.68 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.11 hrs

Average Depth at Peak Storage= 0.19'

Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.40 cfs

2.00' x 1.00' deep channel, n= 0.040

Side Slope Z-value= 5.0 ' Top Width= 12.00'

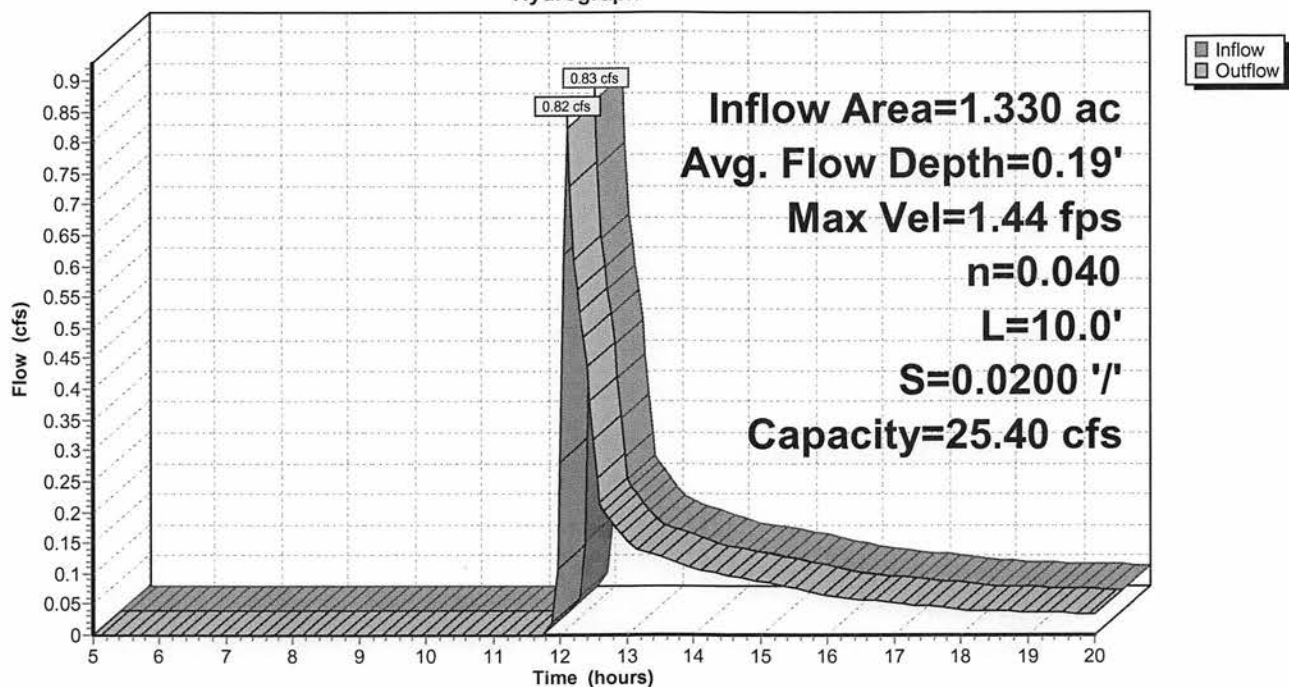
Length= 10.0' Slope= 0.0200 '/'

Inlet Invert= 0.00', Outlet Invert= -0.20'



Reach 1R: POA NORTH EXISTING

Hydrograph



LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 10 YEAR Rainfall=4.60"

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Summary for Reach 10R: POA NORTH

Inflow Area = 1.135 ac, 44.00% Impervious, Inflow Depth > 0.05" for 10 YEAR event
Inflow = 0.03 cfs @ 12.15 hrs, Volume= 0.005 af
Outflow = 0.03 cfs @ 12.27 hrs, Volume= 0.005 af, Atten= 1%, Lag= 7.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.48 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 0.28 fps, Avg. Travel Time= 0.6 min

Peak Storage= 1 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.03'

Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.40 cfs

2.00' x 1.00' deep channel, n= 0.040

Side Slope Z-value= 5.0 '/' Top Width= 12.00'

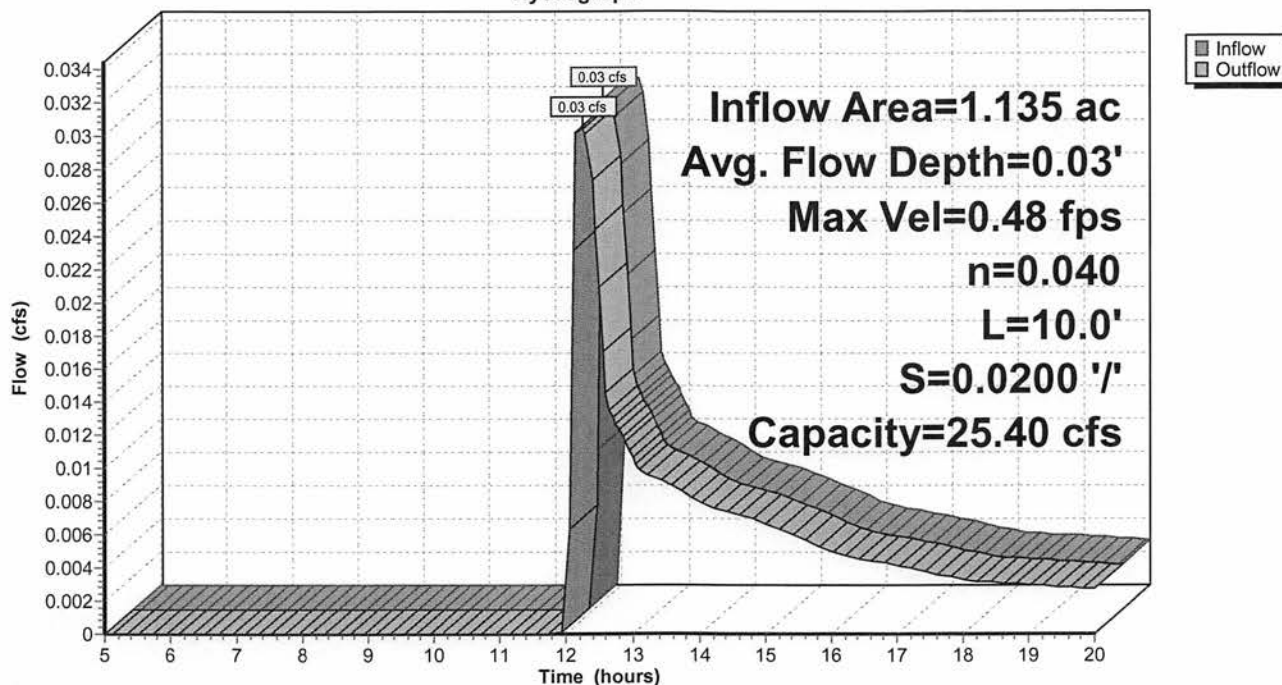
Length= 10.0' Slope= 0.0200 '/'

Inlet Invert= 0.00', Outlet Invert= -0.20'



Reach 10R: POA NORTH

Hydrograph



LUMBER WAREHOUSE, TSG 10.3.18

Type III 24-hr 10 YEAR Rainfall=4.60"

Prepared by Hewlett-Packard Company

Printed 10/26/2018

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Summary for Pond 1P: INFILTRATION AREA

Inflow Area = 0.991 ac, 50.40% Impervious, Inflow Depth > 1.40" for 10 YEAR event
 Inflow = 1.70 cfs @ 12.09 hrs, Volume= 0.115 af
 Outflow = 0.52 cfs @ 12.46 hrs, Volume= 0.115 af, Atten= 69%, Lag= 22.5 min
 Discarded = 0.52 cfs @ 12.46 hrs, Volume= 0.115 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 25.40' @ 12.46 hrs Surf.Area= 2,607 sf Storage= 1,425 cf

Plug-Flow detention time= 37.6 min calculated for 0.115 af (100% of inflow)
 Center-of-Mass det. time= 37.1 min (853.5 - 816.4)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	11,200 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
24.00	400	0	0
25.00	1,000	700	700
26.00	5,000	3,000	3,700
27.00	10,000	7,500	11,200

Device	Routing	Invert	Outlet Devices
#1	Discarded	24.00'	8.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.00'
#2	Primary	26.00'	10.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

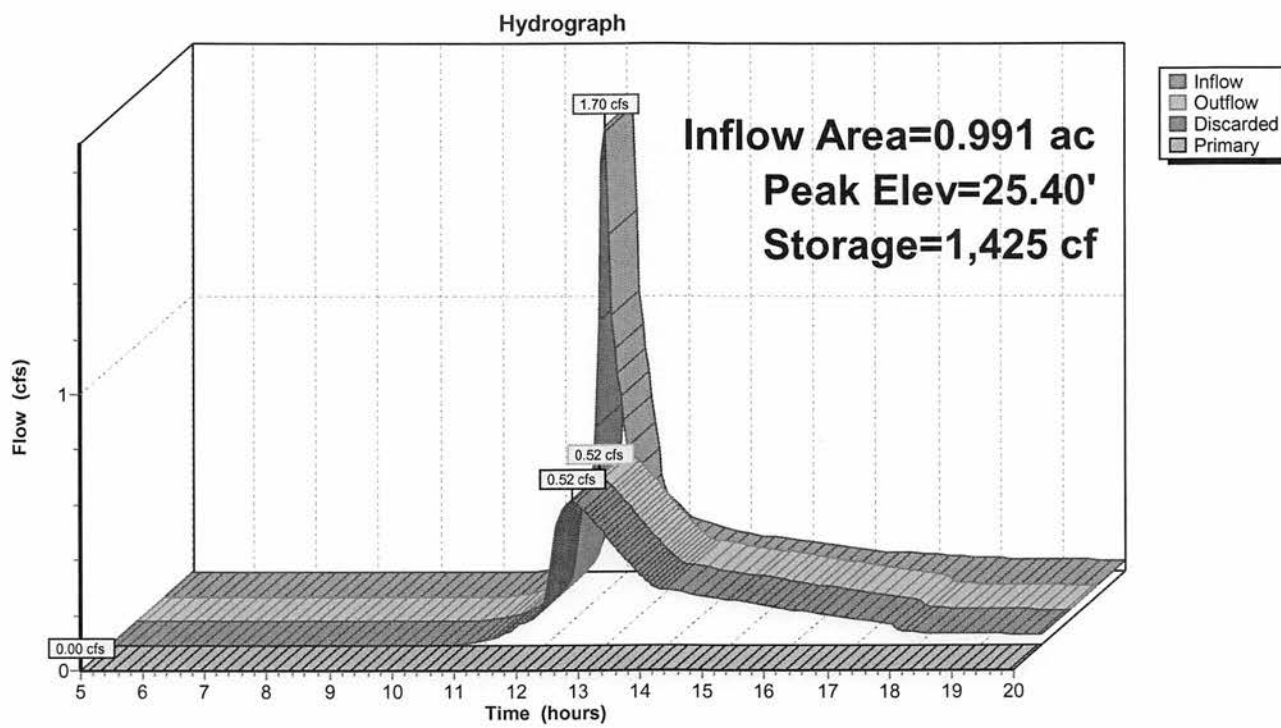
Discarded OutFlow Max=0.52 cfs @ 12.46 hrs HW=25.40' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.52 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=24.00' (Free Discharge)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: INFILTRATION AREA



LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 25 YEAR Rainfall=5.80"

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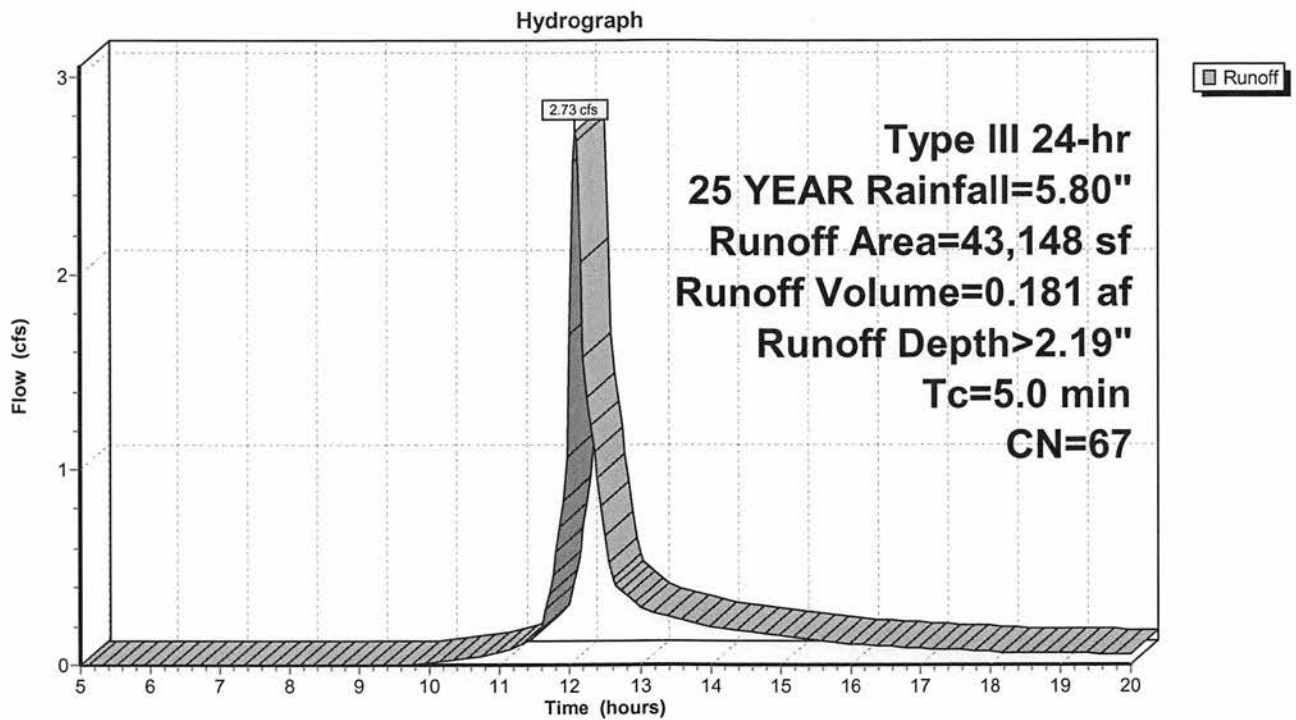
Summary for Subcatchment 10S: DEVELOPED SITE

Runoff = 2.73 cfs @ 12.08 hrs, Volume= 0.181 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (sf)	CN	Description
*	21,746	98	IMPERVIOUS
*	13,720	40	LANDSCAPED
*	7,682	30	WOODS A
	43,148	67	Weighted Average
	21,402		49.60% Pervious Area
	21,746		50.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 10S: DEVELOPED SITE

LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 25 YEAR Rainfall=5.80"

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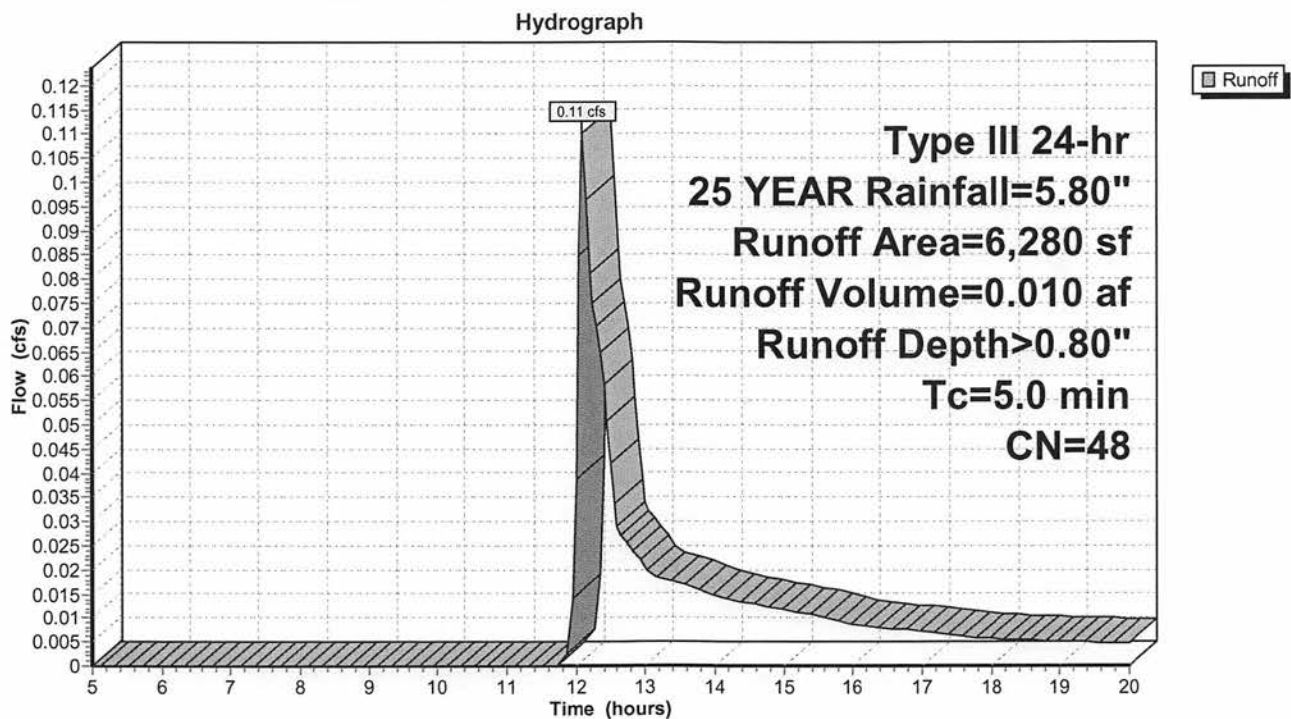
Summary for Subcatchment 11S: DEVELOPED SITE NORTH SIDE

Runoff = 0.11 cfs @ 12.11 hrs, Volume= 0.010 af, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (sf)	CN	Description
*	870	30	WOODS A
*	4,260	40	BRUSH
*	1,150	92	GRAVEL
	6,280	48	Weighted Average
	6,280		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 11S: DEVELOPED SITE NORTH SIDE

LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 25 YEAR Rainfall=5.80"

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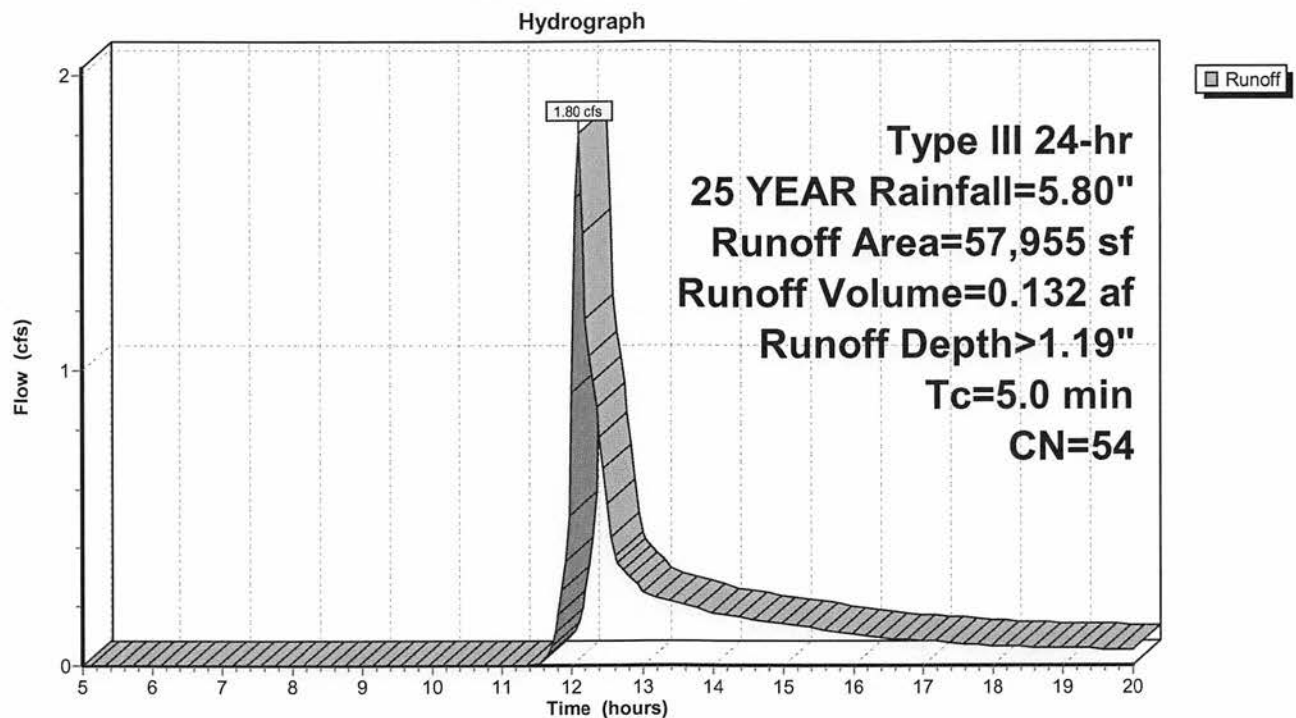
Summary for Subcatchment 14S: EXISTING SITE

Runoff = 1.80 cfs @ 12.09 hrs, Volume= 0.132 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (sf)	CN	Description
*	11,107	98	IMPERVIOUS
*	24,715	40	LANDSCAPED
*	15,681	30	WOODS A
*	6,452	92	GRAVEL
	57,955	54	Weighted Average
	46,848		80.84% Pervious Area
	11,107		19.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, DIRECT

Subcatchment 14S: EXISTING SITE

LUMBER WAREHOUSE, TSG 10.3.18

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Type III 24-hr 25 YEAR Rainfall=5.80"

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Summary for Reach 1R: POA NORTH EXISTING

Inflow Area = 1.330 ac, 19.16% Impervious, Inflow Depth > 1.19" for 25 YEAR event
Inflow = 1.80 cfs @ 12.09 hrs, Volume= 0.132 af
Outflow = 1.80 cfs @ 12.10 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.81 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 0.81 fps, Avg. Travel Time= 0.2 min

Peak Storage= 10 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.29'

Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.40 cfs

2.00' x 1.00' deep channel, n= 0.040

Side Slope Z-value= 5.0 ' / Top Width= 12.00'

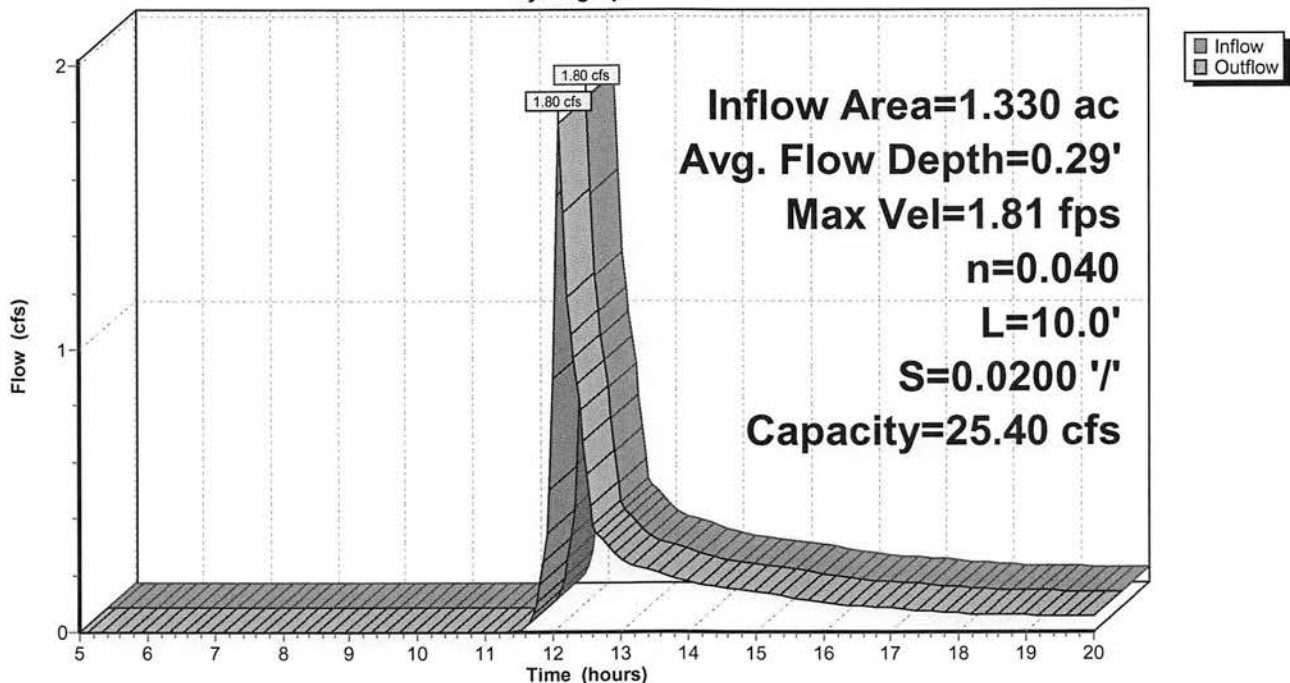
Length= 10.0' Slope= 0.0200 ' /

Inlet Invert= 0.00', Outlet Invert= -0.20'



Reach 1R: POA NORTH EXISTING

Hydrograph



Summary for Reach 10R: POA NORTH

Inflow Area = 1.135 ac, 44.00% Impervious, Inflow Depth > 0.10" for 25 YEAR event
Inflow = 0.11 cfs @ 12.11 hrs, Volume= 0.010 af
Outflow = 0.11 cfs @ 12.11 hrs, Volume= 0.010 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.76 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 0.34 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 12.11 hrs

Average Depth at Peak Storage= 0.06'

Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.40 cfs

2.00' x 1.00' deep channel, n= 0.040

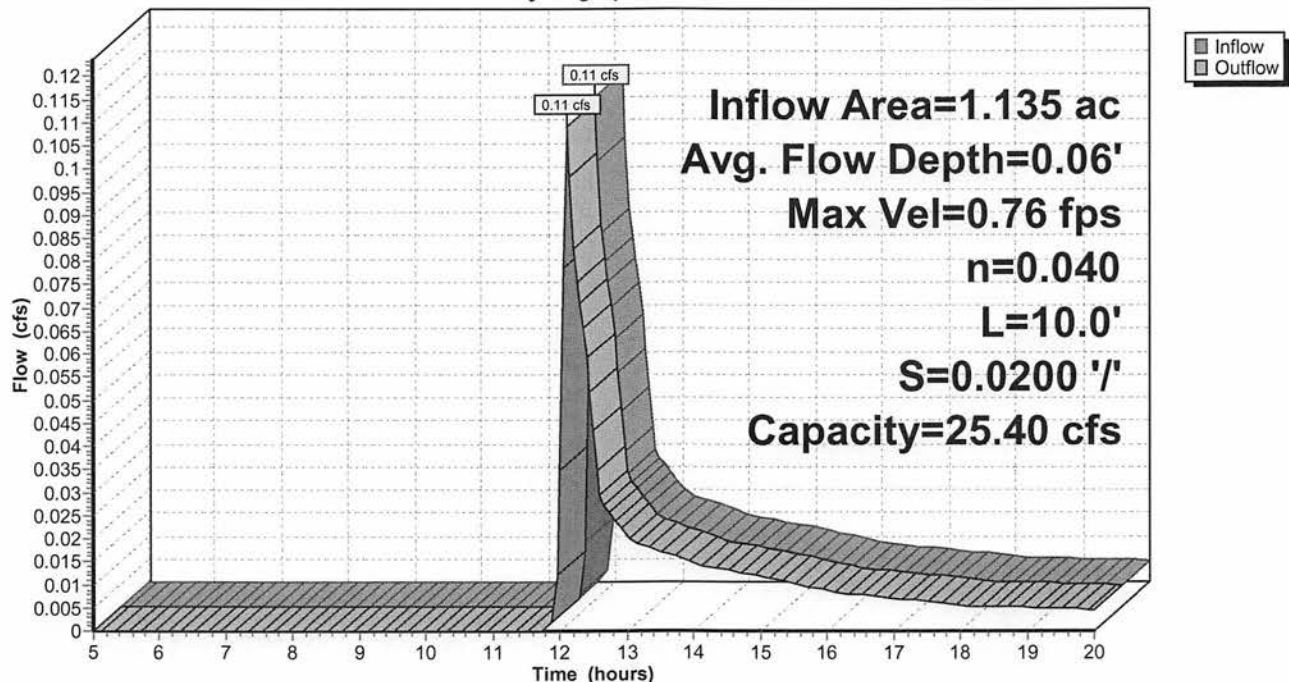
Side Slope Z-value= 5.0 '/' Top Width= 12.00'

Length= 10.0' Slope= 0.0200 '/'

Inlet Invert= 0.00', Outlet Invert= -0.20'

**Reach 10R: POA NORTH**

Hydrograph



LUMBER WAREHOUSE, TSG 10.3.18

Type III 24-hr 25 YEAR Rainfall=5.80"

Prepared by Hewlett-Packard Company

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Summary for Pond 1P: INFILTRATION AREA

Inflow Area = 0.991 ac, 50.40% Impervious, Inflow Depth > 2.19" for 25 YEAR event
 Inflow = 2.73 cfs @ 12.08 hrs, Volume= 0.181 af
 Outflow = 0.78 cfs @ 12.46 hrs, Volume= 0.181 af, Atten= 71%, Lag= 22.8 min
 Discarded = 0.78 cfs @ 12.46 hrs, Volume= 0.181 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 25.71' @ 12.46 hrs Surf.Area= 3,847 sf Storage= 2,425 cf

Plug-Flow detention time= 42.1 min calculated for 0.181 af (100% of inflow)
 Center-of-Mass det. time= 41.7 min (848.0 - 806.3)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	11,200 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
24.00	400	0	0
25.00	1,000	700	700
26.00	5,000	3,000	3,700
27.00	10,000	7,500	11,200

Device	Routing	Invert	Outlet Devices
#1	Discarded	24.00'	8.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.00'
#2	Primary	26.00'	10.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.78 cfs @ 12.46 hrs HW=25.71' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.78 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=24.00' (Free Discharge)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: INFILTRATION AREA

